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Health Organisation

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GENEVA, 1937.

Intergovernmental Conference of Far-Eastern Countries on Rural Hygiene

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INTRODUCTION.

In view of the Intergovernmental Conference of Far-Eastern Countries on Rural Hygiene, which will be held in Bandoeng (Java) from August 3rd to 13th, 1937, the participating countries have been invited to prepare national memoranda covering the items of the agenda of the Conference—*i.e.* :

I. Health and Medical Services.

II. Rural Reconstruction and Collaboration of the Population.

III. Sanitation and Sanitary Engineering.

IV. Nutrition.

V. Measures for combating Certain Diseases in Rural Districts.

Herewith is the report for Malaya.

MALAYAN DELEGATION.

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The Honourable Dr. R. D. Fitzgerald, M.C., Director of Medical Services, Straits Settlements, and Adviser, Medical Services, Malay States, Singapore.

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Captain A. G. Robinson, Director, Drainage and Irrigation, Straits Settlements, and Adviser on Drainage and Irrigation, Malay States, Kuala Lumpur.

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INTERGOVERNMENTAL CONFERENCE OF FAR-EASTERN COUNTRIES ON RURAL HYGIENE

(Bandoeng (Java), August 3rd, 1937.)

REPORT ON MALAYA

Population in 1935 of:

Straits Settlements	1,117,023
Federated Malay States	1,777,421
Unfederated Malay States	528,219
	3,422,663

EQUIVALENTS.

The Straits Dollar	=	Two shillings and fourpence = 100 cents.
Gantang	=	Gallon.
Padi	=	Unhusked rice.
Raiat	=	Peasant.
Kampong	=	Rural hamlet.

I. HEALTH AND MEDICAL SERVICES.

1. Principles governing their Organisation.

Apart from the three municipalities of Singapore, Penang and Malacca, medical and health services are administered by the Malayan Governments.

The attached diagrams outline the Medical and Health Organisation of Malaya (see Appendices A 1 to A 4).

In the Straits Settlements, the Director of Medical Services is the executive head of the department, whereas for the Malay States, which are decentralised, he is the Adviser and exercises no executive control, except in the case of the Institute for Medical Research, which is a Federal Institute.

In the Malay States, each State has its own head of medical department, who obtains advice from the Adviser, Medical Services, but is directly responsible to the Government of the State for the administration of his department.

In general, there are separate parallel services for curative medicine and public health ; these services are closely related and co-ordinated. There is no dual control. In certain cases, medical officers on the curative side undertake health work in addition.

Organisation of Veterinary Service.

The control, treatment and disposal of animals suffering from diseases transmissible to man, the supervision of animal buildings (stables, cattle-sheds, pigsties, poultry-houses, etc.) and of dairies and slaughter-houses and the encouragement of live-stock breeding with a view to increasing the local food supply of meat and milk are entrusted to the Veterinary Department.

In each State or settlement (excepting the States of Kelantan and Trengganu) the department is under the executive charge of a Government veterinary surgeon, a member of the Royal College of Veterinary Surgeons of Great Britain. These officers are directly responsible to the Government of the State in which they are serving, but obtain advice from the Director of Veterinary Research and Veterinary Adviser, Malaya.

2. Personnel.

(a) *Doctors.*

The Malayan Medical Service provides 155 appointments in addition to the Director-Adviser and the Deputy Director :

Superscale Grade A		9
Superscale Grade B		7
Specialists (including 4 dental officers)		22
College of Medicine (Professors)		10
Institute for Medical Research (Specialists)		10
Medical officers [1]	Including leave reserve	49
Health officers [1]		33
Lady medical officers [1]		15

[1] On the time scale.

Medical College.

There exists at Singapore a Medical College named King Edward VII College of Medicine.

The curriculum, since the date of the granting of the recognition by the General Medical Council in 1916, has been planned to conform with the requirements of that body and compares favourably with that of medical schools in Great Britain. The standard of teaching and equipment both in the college and in the teaching hospitals is high.

The course covers a period of six years. Graduates are granted a diploma—the Licentiate of Medicine and Surgery, Singapore.

A uniform matriculation standard is imposed for the admission of students. All candidates are required to sit for the Cambridge School Certificate Examination.

Compulsory registration of all students after the passing of the first professional (pre-registration) examination is required.

There is no provision for a shorter course and diploma to practise as is the case in India.

The Council of the College of Medicine is constituted by Ordinance as the governing body of the college and is entrusted with the entire management of and superintendence over the affairs, concerns and property of the college. The Director-Adviser, Medical Services, is the President of the Council.

The Malayan Veterinary Service provides ten appointments in addition to the Director of Veterinary Research and Veterinary Adviser, Malaya. All these officers are recruited outside Malaya.

Locally Qualified Doctors.

There are 179 locally qualified doctors employed by Government ; of these, 74 are stationed in the Straits Settlements, 64 in the Federated Malay States and 41 in the Unfederated Malay States.

Locally qualified doctors are employed in all Government hospitals and, in the case of the smaller district hospitals, are placed in charge. They are also placed in charge of various outdoor dispensaries and clinics. Their work is mainly confined to the curative side, but in certain cases they undertake health work in addition. Only a small proportion is employed on full-

time health work, as a highly efficient staff of European officers of the Malayan Medical Service at present exists for that service.

Under the Government veterinary surgeons are a varying number of assistant veterinary surgeons and inspectors, graduates of Indian Veterinary Colleges.

There is no college in Malaya which provides a course for local veterinary students.

(b) *Auxiliary Staff.*

(1) *Nursing and Health Sisters.*

Nursing and health sisters are recruited by the Overseas Nursing Association.

There are two separate schemes for nursing sisters and health sisters.

Health sisters have to undergo a special course of training in England before appointment.

In the Straits Settlements, there are sixty-seven appointments, including four health sisters.

In the Federated Malay States, there are 144 appointments, including seven health sisters.

In the Unfederated Malay States, there are fifteen appointments.

Nursing sisters are employed in the larger hospitals. Health sisters are employed at infant welfare centres, which cater for both urban and rural population, but mainly rural.

(2) *Locally Trained Nurses.*

There is a large staff of locally trained nurses (Eurasian and Asiatic), who enter under the scheme as probationers. After a course of training lasting four years, if successful in the examinations, they become "trained nurses" and become eligible in the course of time for appointment as "staff nurses" and "senior staff nurses". Members of the locally trained staff cannot be promoted to the rank of nursing sister.

Locally trained nurses are employed both in the large hospitals and in the small district hospitals.

A certain number of these nurses are attached to the infant welfare centres, are trained in health work and continue to be employed as health nurses after undergoing a course of six months' training at a health centre.

(3) *Hospital Assistants and Dressers.*

Hospital assistants and dressers are gradually being replaced by locally trained nurses.

A large staff of male dressers is, however, required for various purposes. They are recruited locally.

Hospital assistants and dressers are employed in a variety of posts, such as dispensers, laboratory assistants, venereal disease wards and clinics, outdoor dispensaries, male wards in the small hospitals, etc.

(4) *Health Inspectors.*

By arrangement with the Royal Sanitary Institute, London, a course of training is held yearly in Singapore, and, on the recommendation of the Board of Examiners, the Institute grant their certificate if the candidate has obtained the necessary standard at the examination held on completion of the six-monthly course.

The student sanitary inspectors are of two classes, Government and private, and are recruited from the whole of Malaya. Instruction includes sanitation, infectious diseases and their prevention ; malariology, including microscopic and practical field work and mosquito identification ; physics and chemistry ; sanitary engineering and food inspection.

The course has been in existence since 1921. The class is restricted to a maximum of twenty-five students in order to enable a greater amount of individual attention to be given to each student. The fee for the course is $125, with an additional $35 as examination fee. Students who fail at the first attempt may sit again the following year on payment of the examination fee only.

(5) *Veterinary Assistants.*

For work amongst the raiats it is considered best to employ men of their own race, as, if successful results are to be achieved,

the confidence of the people must be obtained. Most of the locally trained assistants are Malays. A sound training is necessary ; but, so far, only a short course at the State-owned buffalo farm has been available, supplemented by such training and instruction as the veterinary surgeon himself has been able to give in the course of ordinary work.

(6) *School-teachers.*

The principles of hygiene and sanitation are taught practically and theoretically in every Malay vernacular school, use being made of the " Ilmu Kesihatan " (" The Science of Health "), a work in two volumes, totalling some 300 pages, that deals fully and satisfactorily, within its limits as a text-book for elementary schools, with the body and its physiology, nutrition, clothing, sanitation, diseases, etc. The teachers are expected to put into practice in their schools and in their own homes the principles that are set out in that text-book, and they generally do so quite satisfactorily. They advise their pupils to follow these principles, and, as far as they can, they see that the pupils do follow them.

3. Curative and Preventive Activities.

Prior to the war, transport in rural areas was mainly effected by rail, bullock-cart or gharry. Motor transport was in its infancy and was the monopoly of the rich. In those days it was necessary, therefore, to provide, in addition to the general hospitals situated in the capital of each settlement and State, a number of small district hospitals and outdoor dispensaries, situated at convenient places and distances.

With the rapid advent of motor facilities since the termination of the great war, the policy of the Medical Department is to provide one large and up-to-date hospital in each settlement and State and to close down, in so far as is possible, the small district hospitals as hospitals and use them as outdoor dispensaries and collecting-stations for the main hospitals, to which patients can be evacuated by means of motor ambulance.

In the Straits Settlements, this policy has been put into effect. Large and up-to-date hospitals have been provided at Singapore, Penang and Malacca, and small hospitals have been closed in so far as this has proved possible.

In the Federated Malay States, owing to the recent depression, this policy has not been put into effect, but schemes for new and up-to-date hospitals at Kuala Lumpur, in Selangor ; at Ipoh, in Perak ; and at Seremban, in Negri Sembilan, are under consideration. When the hospitals are completed, then motor transport will be used to bring patients from rural areas. The advantage of such a scheme is that the patients will receive first-class treatment, if necessary by specialists, while dispensaries are still available for minor ailments.

Health activities in Malaya cover a large field, which includes anti-malaria measures, suppression of infectious diseases, sewage disposal, refuse disposal, water supplies, control of offensive trades, house inspections, estate visiting, school hygiene and medical inspection, general sanitation, food in relation to health and disease, measures to spread knowledge of hygiene and sanitation, and port health work and quarantine administration.

The Public Health Service is based on the principle of regional divisions, in which are situated health units and centres.

Infant welfare centres are placed in charge of health sisters, to whom are attached health nurses, health visitors and trained midwives. The Health sisters refer cases to the lady medical officer, when one is available, and are in all cases in close touch with Government hospitals, to which sick mothers and babies may be referred. All centres are under the control of the health officer, who administers the centres as a health unit in co-ordination with the other health and medical activities of the rural area.

Preventive Activities in Schools.

Preventive activities are carried out in the vernacular schools. Hygiene is a subject of study in every class in every school and the teachers are required to pay attention to the health and cleanliness of their pupils. Every morning, after the gardening and before the ordinary work of the school commences, all heads, hands and clothes are examined by the teachers and

by older boys deputed to help. In Selangor, soap is supplied to the schools and, if a pupil turns up in dirty clothes, he is made to wash them. Clothes are growing cleaner. In the past, soap was an article seldom to be found in a Malay home, but it is now being made at a number of schools—the manufacture is spreading from school to school—and it is already in very much more common use than it was in the days when poverty precluded its being bought.

The dental surgeon does a round of visits, sometimes to local centres, sometimes to individual schools. Schools are notified of his presence in the neighbourhood so that children requiring his services can be sent for treatment to the centre where he is operating.

Occasionally, a special campaign is initiated. In 1936, for example, the health officer, Coast, Selangor, made an extensive survey of several Malay schools, mainly on the subject of nutrition, and, finding that the pupils were badly infected by worms, he arranged in several instances, that the whole school should be transported to the quarantine camp at Port Swettenham, there to spend one night undergoing treatment.

Schools are provided with a practically unlimited supply of quinine, which the teachers may hand out to the pupils, or to anyone in the kampong in need of it.

Children suffering from yaws are sent to hospitals for injections.

It is part of the duty of all teachers to see that every child in attendance at their schools has been or is vaccinated ; it is sometimes, if not always, the rule that a child may not be admitted to school till he has been vaccinated. As the school is generally the vaccination centre when a vaccination compaign is on, it may be taken as a fact that no pupil who attends a Malay vernacular school escapes vaccination.

On signs of any disease, such as measles, chickenpox, mumps, etc., becoming epidemic, the school in the area concerned is at once closed.

All teachers are once a year examined for tuberculosis.

There is a *school medical service* which has aimed at the payment of two visits a year by a doctor to each Government and aided school. The first visit is to inspect the building, its offices and

grounds, and to make a reasonably thorough medical examination of each pupil, referring for treatment by the teacher, the travelling dispensary dresser, at a hospital or at a dental clinic, as their troubles necessitate, the cases that require it. The second visit is to note how far recommendations have been followed and treatment carried out. Medical officers inspect the boys' schools and examine the boys. Lady medical officers inspect the girls' schools and examine the girls; they also examine the girls who attend boys' schools, as well as, occasionally, the small boys in these schools. The full aim of the school medical service has not yet been achieved.

4. Budgets.

Expenditure on Medical and Health Services, 1935:

	$	$
Straits Settlements	3,599,209	
Federated Malay States	3,903,997	
Unfederated Malay States . . .	1,546,227	9,049,433

In addition to the amounts directly expended by the Medical Department, the following amounts were expended by rural and sanitary boards:

(i) *Anti-malaria Work.*

	$	
Straits Settlements	7,000	
Federated Malay States	309,708	
Unfederated Malay States . . .	85,975	402,683

(ii) *General Conservancy and Scavenging.*

	$	
Straits Settlements	35,925	
Federated Malay States	330,362	
Unfederated Malay States . . .	299,320	665,607
Grand Total		$10,117,723

Total expenditure in Malaya—all services:

	$
Straits Settlements	34,764,640
Federated Malay States	51,119,943
Unfederated Malay States . . .	28,009,695
Total	113,894,278

II. RURAL RECONSTRUCTION AND COLLABORATION OF THE POPULATION.

Rural reconstruction is to a large extent dependent upon a desire for improvement and a willingness to work to secure that improvement. Such improvement will be partly dependent on the income of the rural dwellers, who are for the most part smallholders owning on an average about three acres of land. Hence, a great deal of work is directed towards changing the mental outlook of the peasants and introducing better methods of agriculture and marketing.

In this, the Department of Agriculture plays a prominent part. Through its Research and Field Branches, its School of Agriculture, its Farm School and its widely spread staff it is well placed to give that technical advice so much needed by the smallholder. At its test stations, conveniently situated throughout the country, it is continuously employed in testing and selecting pure strains of padi for use by the peasants. The effect of this work is gradually showing itself in the rise in the yield of padi per acre.

While the area under padi fluctuates, the average yield per acre has risen very markedly. The average yield per acre for the five years 1926-1930 was estimated to be 186 gantangs, while that for the next quinquennium was 274 gantangs an acre. The figures for the year 1935 showed a yield of 300 gantangs an acre.

Similar work is being carried out amongst the small coconut holders, who are being taught to produce their own copra and not sell their nuts. A special kiln has been designed to suit

smallholders and a marked improvement is noticeable over the past few years in the quality of the copra produced.

For smallholders of rubber, the Rubber Research Institute has organised a Smallholders' Advisory Service, consisting of a body of Asiatic officers trained at the School of Agriculture and working under the field officers of the Agricultural Department. This Advisory Service is new, but its value is already apparent.

Much attention is also paid to the improvement of the subsidiary sources of income of the smallholders by the distribution of better fruit-trees, by improving the breeds of cattle, goats and pigs and by the introduction of better poultry. A rural lecture caravan carrying films and exhibits is on tour throughout the villages for eleven months in every year. It is operated jointly by the Rubber Research Institute, the Department of Agriculture and the Co-operative Societies Department.

The weakness of peasant economy lies largely in the preparation and marketing of his product, and, while considerable progress can be recorded in the production of a better product, the smallholder is very reluctant to abandon his old methods of sale. Some success has been obtained by the Co-operative Societies Department in the joint marketing of eggs, but combined action for the sale of other products has been rare and usually short-lived.

The co-operative societies in rural areas are being used as channels for the propaganda of technical officers of the Medical, Agricultural and Veterinary Departments and of the Institute of Rubber Research. It is confidently anticipated that the propaganda of the various departments engaged in advising the peasants will, in the course of time, result in a reconstruction of the social and economic life of the rural inhabitants.

Collaboration of the Population.

Compulsion in matters of rural hygiene and sanitation, except for limited periods in limited areas, is rarely practicable and is usually resented. The improvements suggested, if adopted through fear of penalty and not in expectation of benefit, are

usually abandoned if supervision is relaxed. Hence collaboration of the population is essential if there is to be progress.

This collaboration is sought in a number of ways :

(*a*) Through travelling dispensaries.

The officers in charge of travelling dispensaries impart instruction at the wayside halting-places.

(*b*) Through infant welfare centres.

Full use is made of infant welfare centres to disseminate health propaganda. Efforts are steadfastly directed towards teaching mothers how properly to feed, clothe and care for their infants ; visits are paid to the homes of mothers for this purpose. By these means it has been found possible to overcome many of the ignorant prejudices which in the past have been so inimical to infant welfare. At these centres health sisters give simple remedies for minor ailments with a view, principally, of gaining the confidence of the public and relieving immediate distress.

(*c*) Through films.

In the Federated Malay States the lecture van of the Committee for Public Health Education tours the States, giving exhibitions of the films " Aminah " (infant welfare) " Rescue of Swee Kim " (tuberculosis), and " Malaria ".

(*d*) Through exhibitions.

At agricultural shows and exhibitions the opportunity is taken to disseminate health propaganda by lecture, leaflet and through exhibits. Instruction and demonstration are also given on these occasions by officers of the Veterinary and Agricultural Departments on such subjects as the maintenance and improvement of cattle, sheep, pigs, goats and poultry. The aim of the shows is first to make the population conscious that there are problems that require solution and then to supply a simple practicable solution.

(*e*) Through clinics.

Extensive propaganda concerning venereal diseases is issued from social hygiene clinics.

(*f*) Through schools.

Elementary hygiene is systematically taught in all the schools by teachers, and these efforts are supported by the school medical staff, who give lectures and show health films to the pupils (see above under " Preventive Activities in Schools ").

(*g*) Through individual instruction.

Sanitary inspectors and veterinary assistants give much instruction through friendly talks to householders in the course of their rounds.

(*h*) Through co-operative societies.

Rural co-operative societies form a suitable channel for the dissemination of instruction in rural hygiene and sanitation. They provide the health inspector with an audience which is already accustomed in some measure to joint action. The members, through combination, aim to satisfy some need in common and so are likely to be more readily receptive of new ideas. In so far as improvements in rural sanitation entail fresh expenditure, the co-operative society can often assist in the accumulation of the necessary funds. Further, the society provides an organisation on the spot which develops a local *esprit de corps* and stimulates emulation in the direction of rural improvement.

(*i*) Through competitions.

Village sanitation competitions are held from time to time, while competitions have been held between individual members of co-operative societies which may later develop into competitions between societies.

The speed of progress in rural hygiene and sanitation is dependent largely upon teaching, and teaching depends upon the teachers. Experience suggests that the chief requirements of the teachers are: (*i*) keenness to help, (*ii*) personality, (*iii*) practical knowledge, (*iv*) a capacity to teach that knowledge to others.

When it comes to a question of trying to alter the intimate habits of the people, success is more likely if the teachers are drawn from the same race as the taught.

Signs of Progress.

There is evidence that the continuous propaganda and teaching are slowly having effect. The improvement, if slower and more gradual than might be wished, is noticeable. What is particularly satisfactory is that teachers, when they retire and live in houses of their own, look after these as they were accustomed to look after the government quarters which they previously occupied. The houses occupied by retired teachers and by other retired Government servants, such as ex-policemen, are generally the best cared for in the kampongs. Those who have learnt how to keep their houses clean and tidy do not relapse into the ways of their fathers when supervision is removed. A further line of approach to secure the collaboration of the population is through the education of girls and women. When the teaching of domestic science was introduced into the Perak Malay vernacular girls' schools, an early result was that the girls became noticeably cleaner in their clothes and that the teachers started to take more pride in the appearance of their homes. In the Malay Women Teachers' Training College, recently opened in Malacca, one of the most important matters dealt with is the inculcation of good habits by daily practice. When these women return to their schools as teachers, they will not be able to do much more for the good of rural hygiene than teach their pupils the lessons they themselves have learnt at the college on the college hygiene syllabus. It is difficult to get Malays to adopt better ways of doing things unless these are also easier ways.

III. SANITATION AND SANITARY ENGINEERING.

1. Housing.

The old type of Malay house was well ventilated, though it was generally not well lighted. The lack of light did not matter so much to the men and children, whatever was the case as regards the women, for they spent all daylight hours in the open, but there was the loss of its purifying influence. There is now a tendency to have a Chinese-built house, of squared

timber and closely fitting planks where that can be afforded. Such houses, even when supplied with trellis-work near the ceiling, are generally not so well ventilated all the day round as the old Malay type, though in the day time, if only the doors and windows are thrown wide open, they are almost always better lit. Very often trees are planted much too close to the houses ; they make the houses dark and they prevent breezes from reaching them.

The maintenance of sanitary dwellings is engaging the constant attention of the health branch of the Medical Department, and all boys and girls in the vernacular schools leave school with an elementary knowledge of the subject acquired from the school hygiene text-book. Further progress may be anticipated from the propaganda referred to above.

2. Water Supply.

Water supplies of all types exist in the rural areas, from shallow holes in the ground to a piped supply of very high quality. While in general there has been no evidence of outbreak of disease due to polluted water supplies, few of them can be considered fully satisfactory. It is difficult to get householders to make satisfactory protected wells, and, even when a reasonably good well is constructed, it usually lacks the cover and pump essential for safety.

Where there are anti-malaria subsoil drains, provision is made for people to obtain subsoil water for bathing and washing clothes. These water supplies have proved most beneficial to health and are very popular with the people.

To discourage the consumption of raw river water by the riverside inhabitants an *experimental purification plant* has been constructed by the Public Works Department at Pulau Tiga, on the Perak River. It supplies a population of 2,200 within eight chains over a frontage of four miles. The cost of construction was $29,000 and the plant is operated by an Indian steam-roller driver unable to speak English. It was found that the populace would not use the water, even if it were attractive, unless it were reasonably easy to obtain—*i.e.*,

unless there were plenty of standpipes and a fair pressure. The quality of the water is good, and its only disadvantage is that it is not cold. A similar but smaller supply is now under construction six miles down river from Pulau Tiga.

3. Disposal of House Refuse and other Wastes.

In rural areas, the use of properly constructed latrines is still rare ; but knowledge of them is now spreading from the schools at which they have been provided and at which they are mentioned in the hygiene lessons. Tube latrines in suitable areas have been found to be very satisfactory, and full opportunity is taken to introduce this simple and effective method of sewage disposal, wherever applicable.

The disposal of house refuse in the sparsely populated rural areas presents no serious problem. Such part of it as cannot be used as food for poultry or cattle is usually burnt and/or buried. The only problem that arises is in connection with the disposal of animal manure. The only animals concerned are cattle, sheep, goats, swine and poultry, and, of these, only cattle present any problem—and that only when kept in sheds or confined in small enclosures. Theoretically, the manure should be simply disposed of either by burning or by using it in cultivation ; but, in practice, both these methods are far from easy. Cattle manure is too wet to burn, even if sprayed with kerosene, and spreading it in the sun to dry is of little or no use owing to the damp climate. Furthermore, in the country, manure is in little demand for cultivation, and, even in the vicinity of the towns, the local cattle-keepers often have more manure than they can dispose of to gardeners. The solution appears to be to bury or keep the manure heap covered with earth.

4. Campaign against Flies.

There are very few places in Malaya where flies are a nuisance, and it may be said that the housefly is not a problem in Malaya.

IV. NUTRITION.

1. Composition of Food and Methods of its Preparation.

2. Nutritive Value of the Principal Foods peculiar to the East.

The situation as regards Malaya is that there now exists practically complete information in regard to the composition and relative values of the foods. Nearly all the more important foods have been analysed and the results collected in "Chemical Analyses of Malayan Foods", published by the Government Printer, Singapore, in 1935. It should be observed that the large majority of the foods analysed has been purchased in the Singapore markets, so that their source of origin is unknown, but it is likely that most of them were imported. There is a very wide and varied supply of foods, so that, if it were possible to overcome racial prejudice and habit, it should be easy to rectify any possible deficiency and to make great progress towards an improvement of all diets. The average nutritive value of a man's diet in this country is, as a rule, proportional to his spending power.

As rice is the most important food in this country, special consideration has been given to its nutritive value. In rural areas where padi is grown, most of the inhabitants eat the local-grown rice prepared by hand, though padi planters in Krian have been known to sell their padi to the mill and buy the white polished rice. In other parts, the rice sold in the shops is usually polished and washed and in this form is devoid of any vitamin whatever. The process of polishing also reduces its more important mineral ingredients, such as lime and iron, to minimal quantities, thus rendering an acid-producing ash like a meat. Consequently, a diet composed of white rice and dried fish, while supplying the computed requirements of energy and protein, might well be considered a poison rather than a diet. These foods constitute the basis of some of the poorer diets.

The same may be said for parboiled rice in Malaya, which is largely consumed by Indians. The method of parboiling

and washing destroys too much of the vitamin B and a subsequent polishing destroys nearly all the rest. In addition to the destruction of vitamin B, the mineral constituents are diminished in quality and quantity.

The Government rice-mill at Bagan Serai, in the State of Perak, provides rice which has been husked but not polished or only slightly polished. Numerous experiments have been carried out with the mill rices, and, while slight polishing is still too much, the husked rice is excellent. The experiments made on animals show that the difference between the white rice and the husked rice has been so striking as regards growth, general health, breeding, rearing of young, death rate, susceptibility to ailments like colds, and longevity, that it would appear to be better to live on a supposedly poor diet with husked rice as a basal cereal than upon a "good" diet with white rice as the basis.

The results of work done on nutrition in Malaya have been incorporated in the hygiene text-book used in all Malay vernacular schools, and these results are now being taught throughout Malaya. Malay teachers have had explained to them the principles of nutrition and the method of making use of local foodstuffs in the provision of a perfect diet. A pamphlet describing an attempt through the schools to educate the people of Malaya on the subject has been published.

In the Federated Malay States 90% of the Malay vernacular schools, and 80% of those in the Straits Settlements, have vegetable and flower gardens. The pupils are encouraged to start similar gardens at their homes, and during the recent depression much progress was made. With the return of better economic conditions, there has been a reduction in the number of these home plots. Vegetables in abundance are on sale at the weekly markets and an ample supply of them can be obtained for a few cents. It would appear that the average Malay has decided that he can buy vegetables so cheaply that it is not worth his while to grow them. In any case, there are nearly always vegetables of some kind growing in his compound without any attention from him.

Malays generally do not keep fish-ponds, except in certain padi areas, and experiments are being made in selected areas

to see if the habit of keeping fish-ponds can be more widely introduced.

From the large amount of data now available as to the composition and nutritive values of food, a start has been made to produce *daily diets*, each of which shall possess a proper physiological balance, and which, taken as a whole, shall supply a wide variation in order to satisfy the palate and to mask deficiencies which may yet remain undiscovered. It is a stipulation that each diet can be prepared adequately by simple means available to the poorer people who have no very wide experience of numerous methods of cooking. This work is not yet complete.

In the past, the rural population of Malaya drank very little milk. Jungle and swamp largely predominated, and grazing-grounds of any considerable dimensions were scarce. In recent years, the consumption of milk in rural areas has increased, but it is tinned milk, not fresh milk, that is drunk. The Veterinary Department has supported the propaganda of the infant welfare centres by trying to show that a supply of fresh milk can be obtained locally by the people themselves if they desire it. Fortunately, in Malaya, tuberculosis, the chief disease transmissible from cattle to man through milk, is almost non-existent in cattle. So far, however, the demand for and use of fresh milk in rural areas is not great. Experiments have recently been initiated at the instance of the Veterinary Department with a view to improving the milking-cows owned by Indian labourers on rubber estates, and it is hoped to extend the scheme to the Malays in the kampongs. Also, demonstrations have been given of the preparation of ghee from buffalo milk. Amongst the rural population, butter is rarely used, but ghee is sometimes used for cooking.

3. Minimum Cost of Adequate Nutrition and Allowance for Food in Family Budgets [1].

Based on the retail prices of food in the Singapore markets at the end of 1936, it is estimated that the minimum cost of an adequately balanced diet lies between 25 and 30 cents a day for food.

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[1] See Appendix B for average rates of wages of employees.—*Editor.*

No scientific enquiry has been made into the minimum cost of adequate nutrition under rural conditions, but a rough enquiry as to the monthly cost of food for a family of four (husband, wife, boy of 9 and girl of 4), based on what a Malay family living in a rural area would regard as an adequate diet, has been made. The cost in various parts of the country at the prices ruling about the middle of 1936 varied between $11 and $14 per mensem, averaging about $12.50 per mensem. It should not be inferred that all or even the majority of rural families actually do spend this sum on food. This figure represents what on an average a rural family would like to spend on food if it had the cash available and had to pay for all its requirements.

Similarly, it is estimated that the cost of food at the prices ruling at the end of 1936 of an adult Indian labourer would average about $5.50 per mensem. This food, however, does not represent a scientifically balanced diet, but is the normal diet in actual practice of an Indian labourer in full employment.

4. Diet and Health : Deficiency Diseases.

While beriberi, xerophthalmia and other marked deficiency diseases are still reported in statistics, the matter seems to spread farther than the end-points of actual definable diseases. Stamina appears to be lower than in Europe, and this refers, not only to the poorer coolie classes, but to the more educated as well. In regard to manual work, more individuals are required to do a given task in a set time than in Europe. It has been found that the average Asiatic inhabitant is about 10% lower in basal metabolism than the standard for Europeans. It has also been found that the basal metabolism of the European becomes lowered in Malaya, but it can be raised by leave in Europe and even by local leave at a hill station. Accordingly, it would seem that climate is a more important factor than race.

There would appear to be two main deficiencies commonly prevalent in Malaya. The first is caused by polishing the rice, resulting in the supply of vitamin B being reduced to a negligible amount, and also in the reduction of the more important

mineral elements to such small quantities that they are out-balanced by those less valuable.

The second deficiency—protein—is caused by its expense. With the exception of dried fish, most forms of protein are expensive, and it has been shown that dried fish as the sole protein food gives poor results compared with milk and eggs.

5. Plans for a Co-ordinated Nutrition Policy based on the Collaboration of the Health, Educational and Agricultural Services.

Pending the accumulation of further data on the problems of nutrition in Malaya, no plans for a co-ordinated nutrition policy have been made beyond what has been set out in the preceding paragraphs.

V. MEASURES FOR COMBATING CERTAIN DISEASES IN RURAL DISTRICTS.

1. Malaria.

The main activities of the Health Branch of the Medical Department are directed against malaria, as this disease constitutes one of the major public health problems.

Constant efforts are being made to check the spread of the disease by means of appropriate anti-malaria measures and by raising, in general, the standard of rural sanitation.

Anti-mosquito measures may be permanent or temporary. Amongst the means used to control malaria are drainage and oiling.

The methods of drainage applicable are :

(*a*) Surface drainage methods ;
(*b*) Subsoil drainage methods ;
(*c*) Tidal drainage methods.

Permanent anti-malaria works include surface drainage by masonry drains ; subsoil drainage by means of masonry pipes, or bamboo ; large open agricultural drains ; stone

packing of ravines and seepages ; reclamation of land ; tidal drainage by means of bunds and tidal gates ; filling of dangerous pits, pools, drains, etc. ; drainage of unfelled jungle areas where *A. umbrosus* is a menace ; regulation of all new agricultural or public works which involve opening up of lands ; betterment of health and living conditions.

Temporary measures include :

(*a*) Oiling of streams, ponds, drains, pools, seepages, pits, etc., until permanent works can be undertaken ;

(*b*) The application of paris green in places where oiling is not advisable ;

(*c*) The " petrolising " of domestic water supplies where dangerous mosquitoes breed ; flushing or sluicing of hill streams and ravines ; fascine drainage ; clearing and clear-weeding of drains ; stocking of ponds and reservoirs with larval-eating fish ; screening, shading, etc., the treatment of infected patients.

Breeding-places for dangerous mosquitoes in the most populous or otherwise important areas are oiled for a distance of half-a-mile from the outskirts of the village or district, the proximal ravines are then drained and the oiling areas extended farther into the country or new malaria-prohibited zones are formed.

Apart from measures of drainage, subsoil or otherwise, the chief weapon against mosquitoes is oil.

Oil is stored in 65-gallon drums at convenient centres in the various malaria-protection zones ; from these centres the coolies transport the oil daily in tins to the field of operation and transfer it for spraying into " Four Oaks " sprayers.

The usual oiling routine is so arranged that each zone or district is treated within periods of six days, but in certain cases oiling is undertaken at ten-day intervals.

Treatment may be prophylactic or curative, individual or mass. Quinine is distributed free at vernacular schools, police-stations and health centres.

The western seaboard of Malaya is fringed for the most part by mangrove flats, which are low-lying and are subject to inundation by sea-water. Attempts have been made by the

peasants to reclaim the areas for the purpose of planting coconuts, but the land still suffers severely from periodic flooding. By reason of this periodic inflow of muddy water, which forms ponds in the inadequate drainage channels, stagnation occurs and the pools form ideal breeding-places for anopheline mosquitoes—particularly *A. sundaicus*. In such areas the general health is poor and the conditions of living reach a very low standard.

A start has been made by the Drainage and Irrigation Department on several schemes to construct really substantial bunds round selected areas. The funds for works of a major order are provided by Government, while the small feeders to the main drains will be dug by the peasants themselves. Present plans cover a number of schemes of a total area of 137,000 acres, which will be drained and protected from the ingress of the sea. These schemes will not only reduce the incidence of malaria, but will also render additional areas fit for agriculture. In addition, large areas are being drained for the purpose of making the land suitable for the growing of wet padi. The opening up of these swampy areas will provide the rural population with additional food supplies under healthy conditions.

Though he is taught and knows the necessity for, not to mention the comfort of, sleeping under a mosquito-net, the average Malay prefers to rely, as his father did, on the smoke from coconut husks burning under his house for the driving away of the mosquitoes.

2. Plague.

The incidence of human plague has been low. It has had no influence on the death rate. The mortality has been high.

Plague has existed among the rat population for the last thirty years. The predominant flea is *X. cheopis*. The flea index is low.

Rat-catching is undertaken at ports.

No special measures are taken in rural areas, as plague is neither endemic nor epidemic.

3. Ankylostomiasis.

(*a*) *Medical Treatment.*

Treatment is available at Government hospitals, outdoor dispensaries, infant welfare clinics and travelling dispensaries. Mass treatment is given on estates and at schools.

(*b*) *Control of Soil Pollution.*

Rapid advance has been made in the control of soil pollution during the past decade through the establishment of conservancy systems in villages and the construction of latrines.

"Pail latrines"—the complete sanitary structure with pail—can be built at a cost of $6 (Straits).

"Tube latrines" bored by an auger; these are bored as a demonstration and the auger is then lent to villagers to bore their own tube latrines.

The use of night-soil on vegetables is prohibited.

4. Tuberculosis.

The prevention of tuberculosis forms part of the routine duties of the health branch and receives attention under five main headings.

(*a*) *Education.*

Every endeavour is made by means of films, posters, leaflets, informal talks, etc., to educate the people in methods of cleanliness and personal hygiene with a view to avoiding infection and limiting its spread. Knowledge of this kind is being steadily spread by health officers, sanitary inspectors, child welfare sisters and nurses, and by school medical officers, in the course of their daily duties. Broadcasting will shortly be introduced.

(b) *Improvement by Housing and General Sanitation.*

Singapore possesses an Improvement Trust, whose aim is to eradicate overcrowded slum areas and erect sanitary

dwellings elsewhere with plenty of air and space. During the past few years, the Improvement Trust has acquired several large blocks of slums and pulled them down or established open spaces in their centres. The Trust has built 118 better-class cottages for occupation by the clerical classes and two large blocks of tenements comprising about 250 rooms. It has also erected 224 artisans' dwellings. This replacement of overcrowded, ill-ventilated slum dwellings by proper housing facilities is regarded as one of the most potent of anti-tuberculosis measures.

(c) *Special Measures of Sanitation.*

With a view to protecting the population against the debilitating effects of malaria and ankylostomiasis, preventive and curative measures are carried out on a large scale, which in their turn improve the general health and raise the natural resistance of the people and so render them less susceptible to tuberculosis.

(d) *Diagnosis.*

The importance of early diagnosis is given due prominence in the prevention of the spread of tuberculosis. Tuberculosis is a notifiable disease, and practitioners are required by law to notify cases, for which they receive a fee of $2 (Straits). The number of such notifications received from private practitioners, Government outdoor dispensaries, travelling dispensaries, hospital out-patient departments and child welfare centres show that these sources detect a number of early cases and bring them under treatment. Facilities exist at all these centres for the collection and examination or forwarding of sputa for detection of tubercle bacilli. Advice and treatment are given when necessary, and arrangements are made for placing the patients under hospital treatment when such is required. In the course of regular school medical inspections, special attention is directed to the detection of suspected or early cases of tuberculosis, and such cases are kept under observation and given appropriate advice and treatment.

(e) *Treatment of Tuberculosis.*

Beds for tuberculous cases are available in all the larger hospitals, and facilities exist in the following hospitals for modern medical and surgical treatment :

		Beds for tuberculosis
I.	General Hospital, Singapore	84
II.	Tan Tock Seng Hospital, Singapore . . .	36
III.	General Hospital, Penang	63
IV.	General Hospital, Malacca	42

In the smaller district hospitals, beds for tuberculosis patients are provided as required, and patients requiring special treatment can be transferred to the nearest general hospital.

5. Pneumonia.

No special steps are taken to combat pneumonia in rural areas other than the normal treatment provided in hospitals.

The death rate for pneumonia in Malaya is high and may be taken as above 50%.

6. Yaws.

Yaws is a disease confined almost exclusively to the Malays.

(*a*) The Committee for Public Health Education has issued a pamphlet on yaws in both English and Malay, stating the cause, method of infection, symptoms and treatment. Educational campaigns are carried out through the medium of travelling dressers and village headmen.

(*b*) Injection campaigns are carried out by assistant surgeons and dressers.

(*c*) Regular clinics and treatment centres are established at district hospitals and dispensaries.

7. Leprosy.

(a) *Legislation.* — At present, compulsory segregation is in force in Malaya.

(b) *Leper Settlements.* — There are five leper settlements—three in the Straits Settlements, one in the Federated Malay States and one in Johore.

	Beds
Straits Settlements :	
Pulau Jerejak, Penang	1,100
Female settlement, Penang	65
Singapore	190
Federated Malay States :	
Sungei Buloh	1,850
Johore :	
Johore Bahru	195

(c) Immigrants are examined at quarantine stations and ports of entry.

(d) Emigrants from Malaya are examined at ports of departure.

(e) *Treatment.* — Before specific treatment for leprosy is started, the patient is examined and treated for any other disease from which he may be suffering. The course of the treatment is adjusted to his individual condition as far as possible ; routine treatment is unavoidable and is recognised as being not satisfactory.

The method of treatment which is used for nearly all cases is intramuscular and intradermal injection of iodised esters of hydnocarpus oil.

A recent development has been the use of a non-iodised ester containing 2% anæsthesia.

Fluorescin is also used in the form of a 2% solution given intravenously in doses of 10 to 20 c.c.

Experimental work has been carried out with derivatives of phthalin and resorcin.

8. Mental Diseases and Drug Addiction.

(a) *Mental Diseases.*

Patients are admitted to mental hospitals :

(1) On a medical order that the patient is of unsound mind ; or

(2) On a medical order that the patient is a proper person to be taken charge of and detained for medical treatment ; or

(3) On a magistrate's order ; or

(4) As a voluntary boarder.

(b) *Mental Hospitals.*

There are three hospitals for mental patients in Malaya—one at Singapore, to accommodate 1,430 patients ; one at Tanjong Rambutan, in Perak, Federated Malay States, to accommodate 2,350 patients ; and one in Johore, to take 500 patients. A new mental hospital to accommodate 1,000 patients is in course of construction in Johore.

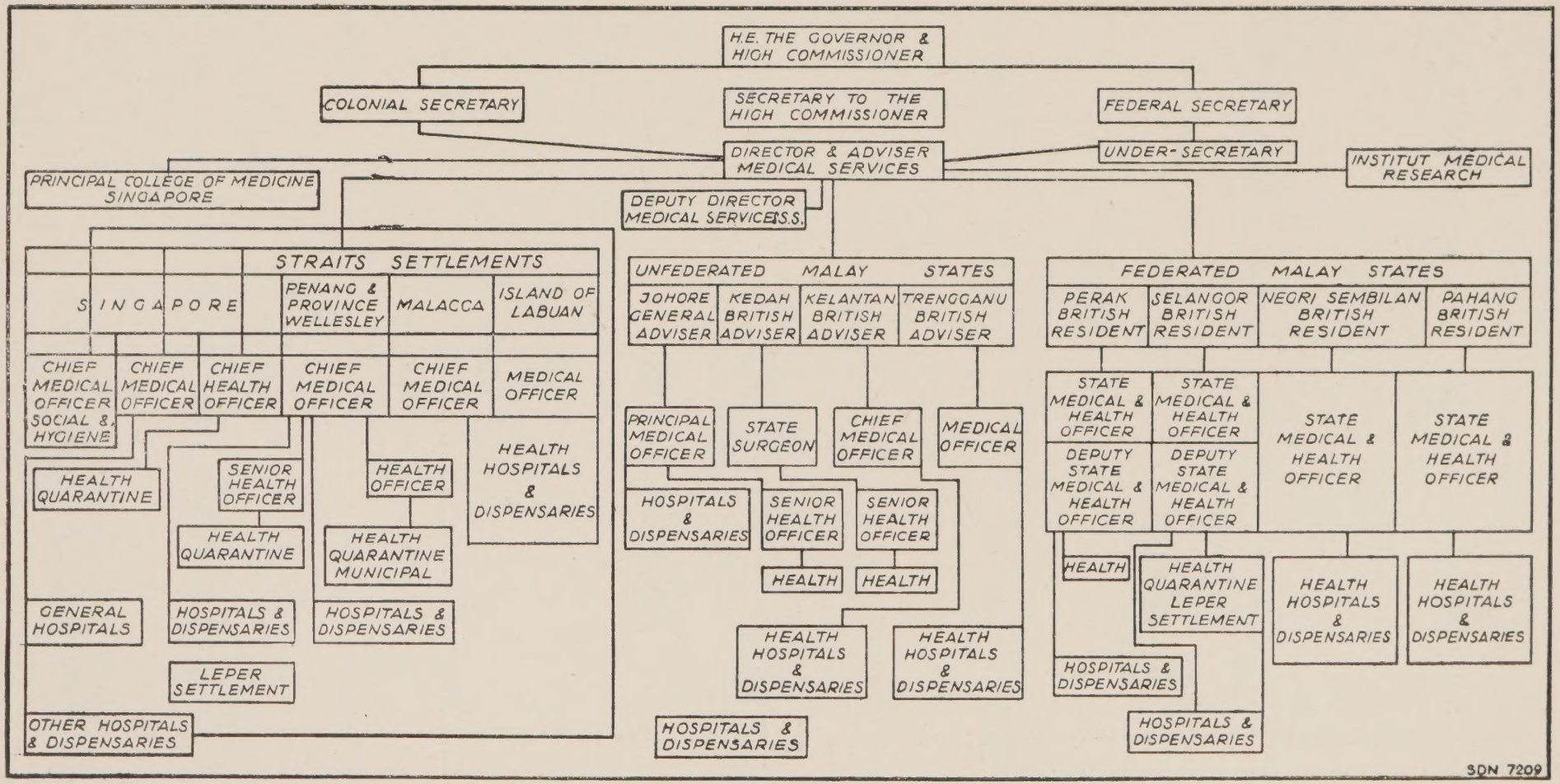
(c) *Drug Addiction.*

Treatment is available at all hospitals for opium addicts.

Appendix A.

1. Scheme of the Organisation of the Medical and Health Services, Malaya.

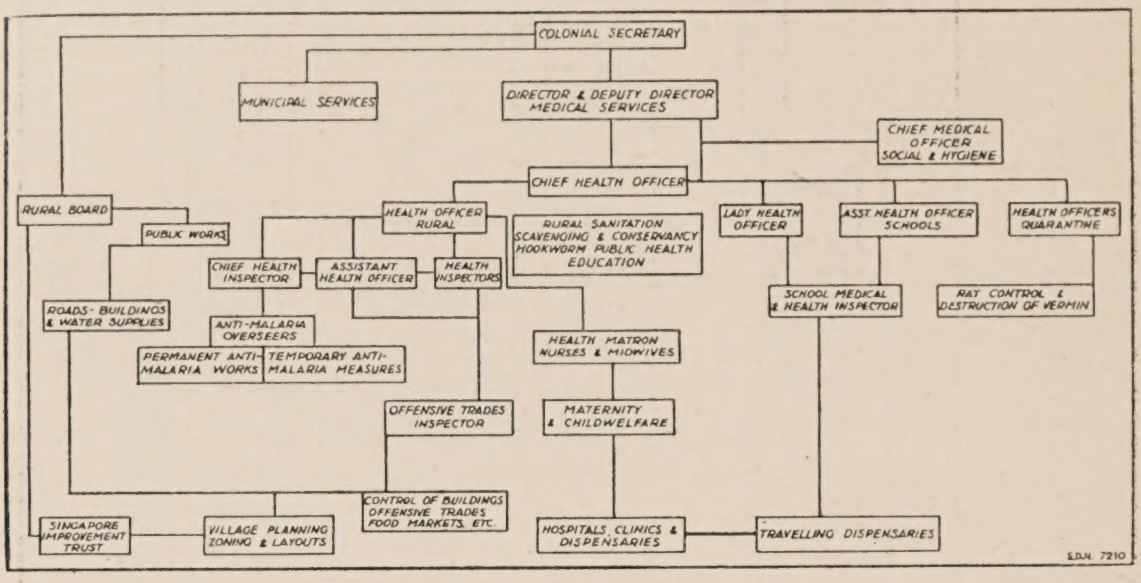
(Diagram referred to on page 7.)



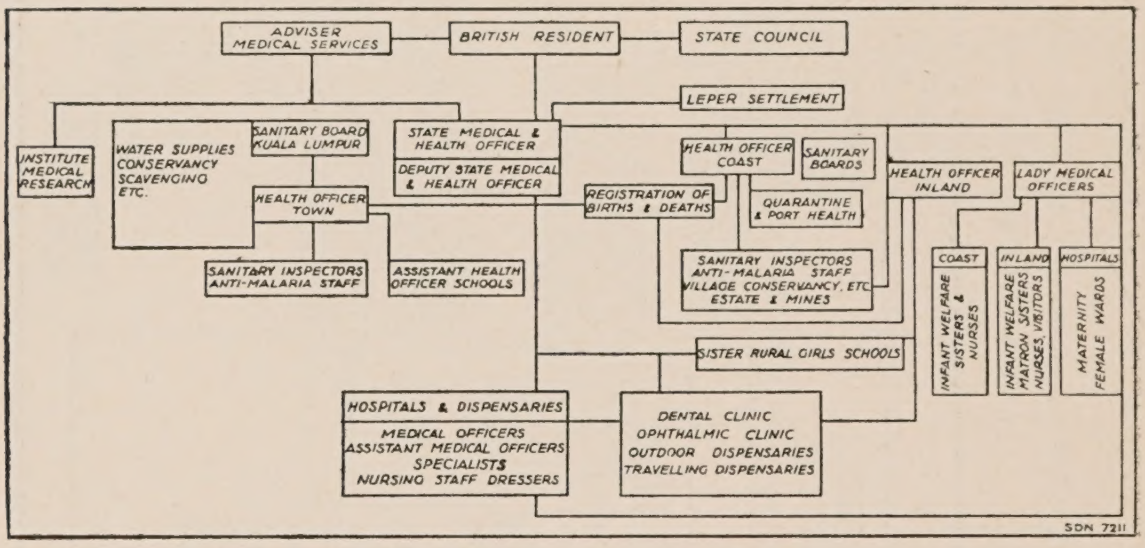
Appendix A.

(Diagrams referred to on page 7.)

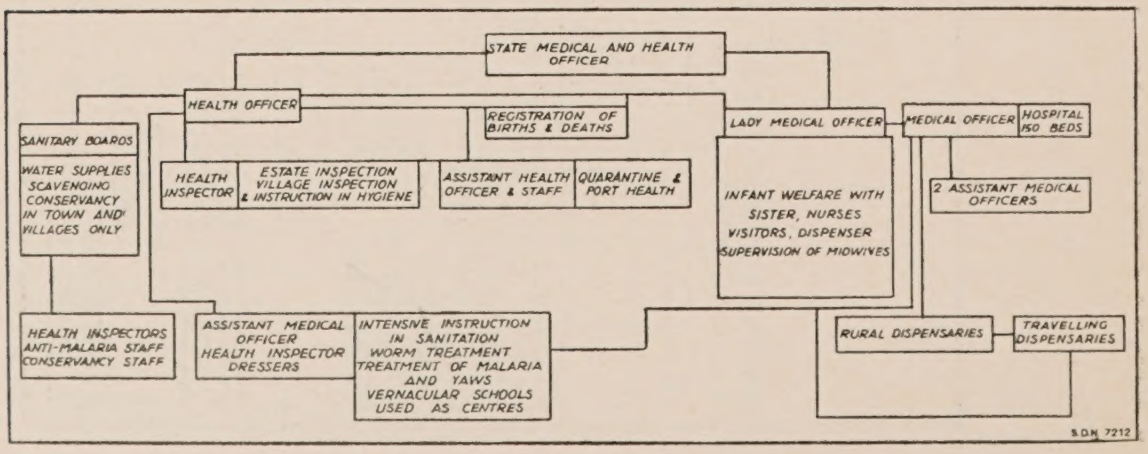
2. Detail of Rural Health Organisation, Singapore.



3. Detail of the Medical Organisation of a Federated State : Selangor.



4. Detail of Organisation of a Regional Unit, Selangor Coast Area.


STATE MEDICAL AND HEALTH OFFICER
HEALTH OFFICER
REGISTRATION OF BIRTHS & DEATHS
LADY MEDICAL OFFICER
MEDICAL OFFICER
HOSPITAL 150 BEDS
SANITARY BOARDS
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ASSISTANT HEALTH OFFICER & STAFF
QUARANTINE & PORT HEALTH
INFANT WELFARE WITH SISTER, NURSES VISITORS, DISPENSER SUPERVISION OF MIDWIVES
2 ASSISTANT MEDICAL OFFICERS
HEALTH INSPECTORS ANTI-MALARIA STAFF CONSERVANCY STAFF
ASSISTANT MEDICAL OFFICER HEALTH INSPECTOR DRESSERS
INTENSIVE INSTRUCTION IN SANITATION WORM TREATMENT TREATMENT OF MALARIA AND YAWS VERNACULAR SCHOOLS USED AS CENTRES
RURAL DISPENSARIES
TRAVELLING DISPENSARIES
S.D.N. 7212

Appendix B.

PERSONS IN EMPLOYMENT AND AVERAGE RATES OF WAGES.

Occupations	Average rates of wages, distinguishing whether monthly, weekly, daily, per task *(a)*; including value of any payments in kind *(b)*		
	Males (per day) Cents	Females (per day) Cents	Children (per day) Cents
A. — *Government Employment.*			
Singapore :			
Municipality	50—95	—	—
Public Works	47—$1	—	—
Admiralty, Air and War Departments	50—80	—	—
Civil Aerodrome	49—70	—	—
Health and Harbour Board	45—60	—	—
Railways	40—60	—	—
Others	47—65	—	—
Penang and Province Wellesley :			
Municipality	50—$1.44	—	30
Public Works	40—70	32—40	—
Health	45—80		—
Harbour Board	60—84		—
Railways	40—$1	32—40	—
Posts and Telegraphs	40—$1.15	—	—
Others	40—75		
Malacca :			
Municipality	45—90	25	—
Public Works	40—70	32—35	—
Health	40—50	—	—
Posts and Telegraphs	40—65	—	—
Railways	40—60	32	—
Others	40	—	—
B. — *Agricultural.*			
Singapore :			
Tappers	35—40	28—32	20—25
Weeders	32—40	28—32	—
Factory labourers	35—55	32	—
Penang and Province Wellesley:	35—40		
Tappers	35—40	28—32	16—35
Weeders	35—68	30—32	16—35
Factory labourers	(40—45 normal)	32	16—35

Occupations	Average rates of wages, distinguishing whether monthly, weekly, daily, per task *(a)* ; including value of any payments in kind *(b)*		
	Males (per day) Cents	Females (per day) Cents	Children (per day) Cents
Malacca :			
Tappers	30—40	25—32	10—20
Weeders	30—40	25—32	10—20
Factory labourers	40—50	32—45	10—20
C. — *Other Industrial Manufacturers.*			
Singapore	55—$1.08	—	—
Penang and Province Wellesley	50—$1.30	—	—
Malacca	50—70	—	—

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